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Technical Memorandum

To: Mark Taylor/David Porter, SOUTHDIV
Brian Donaldson, USEPA Region IV
Jim Morrison, TDEC
Rob Williamson, NSA Memphis
Jack Carmichael, USGS

From: Ben Brantley, E/A&H

Date: June 20, 1997

Re: PCE detection in Background Wells BG5-UF and BG5-LF (Revision 0)

This memorandum summarizes activities conducted in response to the perchloroethylene (PCE) detection at the background well cluster (BG5) near the southwest corner of NSA Memphis Northside and efforts to identify whether the contamination was originating on Navy property.

PCE was detected in the fluvial deposits groundwater at wells BG5-UF and BG5-LF during initial RFI sampling of the background well clusters in March 1994. PCE concentrations of 17 μg/L were detected in groundwater collected from the upper fluvial deposits well BG5-UF while 27 and 28 μg/L (duplicate) were detected in groundwater from the lower fluvial deposits well BG5-LF.

Confirmatory samples collected two months later had similar results — 19 μg/L of PCE in the upper fluvial deposits groundwater and 27μg/L and 28 μg/L (duplicate) in the lower fluvial deposits groundwater. To date, PCE has not been detected in groundwater from the cluster's loess well (BG5-LS).

The source of the PCE was unknown. A review of old aerial photographs showed a shack near the present well cluster, which further investigation identified as having been used as a guard house. The closest SWMU to the well cluster is the Aircraft Fire Fighting Training (SWMU 5), approximately 700 feet to the east, where PCE was not detected in fluvial deposits or loess groundwater during earlier investigation. At later BCT meetings, participants speculated that a sanitary sewer line along the north side of Navy Road may have carried solvent waste from the base, and was a possible source of contamination. However, it was subsequently

determined that a sewer line does not exist along the northern edge of Navy Road.

A commercial dry cleaners was observed approximately 700 feet east-southeast of the background well cluster in a commercial strip center on the south side of Navy Road. The dry cleaners may be a possible source of the contamination — PCE is a commonly used solvent in commercial dry cleaning. Furthermore, the general groundwater flow direction determined from background wells showed fluvial deposits groundwater generally flowed from the dry cleaner toward the background well cluster. A historical check of the property found that the site has been occupied by a dry cleaners since 1966. It formerly operated under the names of "Laxton Laundry" and "Johnson Laundry" and today it is named "Jetway Laundry."

In June 1995, four groundwater samples were collected from the top of the fluvial deposits at BG5 with a DPT rig. One sample was collected at the well cluster and the others were collected 50 feet east, west, and north of the cluster (shown as BG5G004 through BG5G007 on Figure 1). A PCE concentration of 7.7 μg/L was detected in the sample east of the well cluster (BG5G006), toward SWMU 5 (shown in Figure 1).

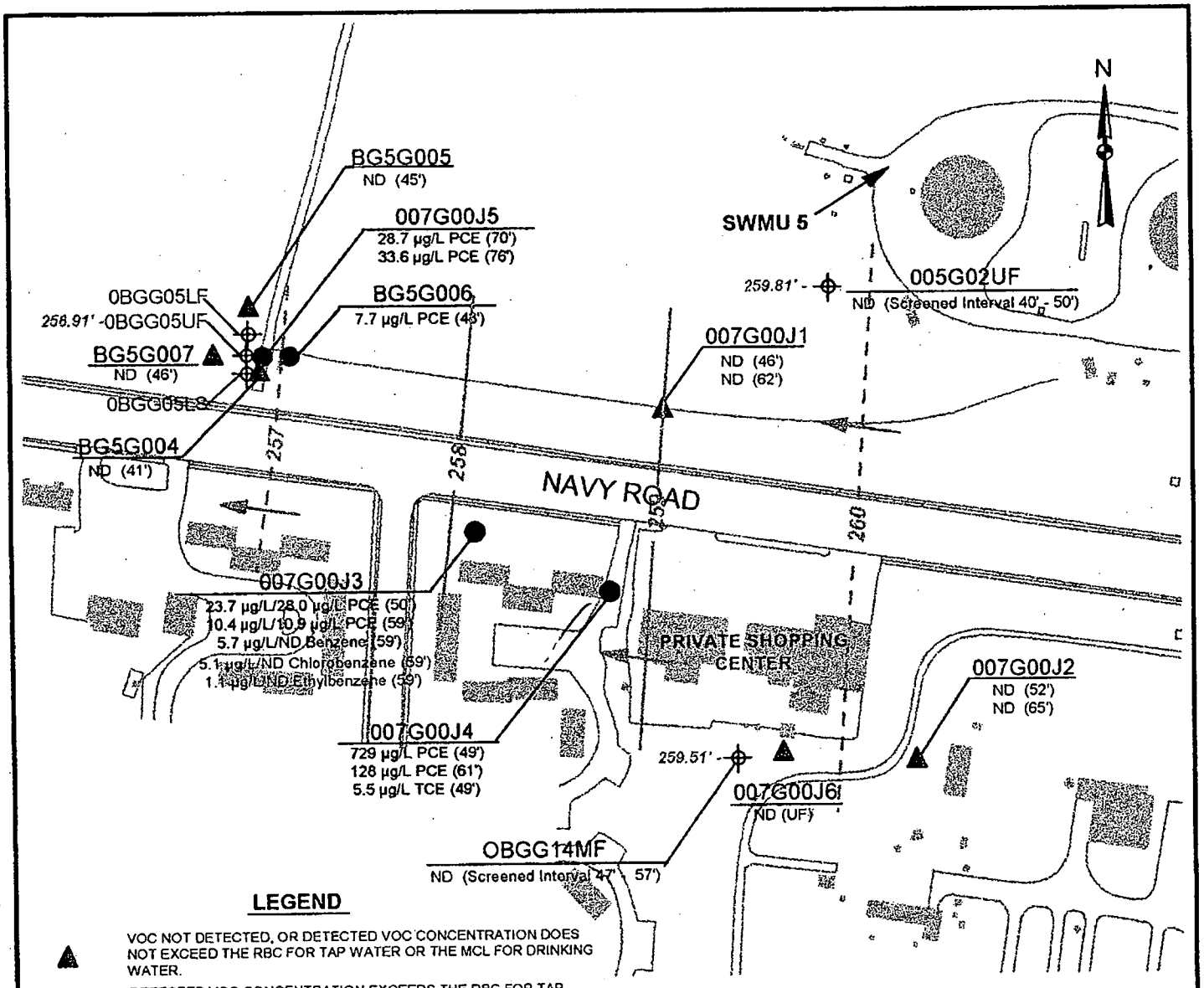
A DPT rig was again used in October 1995 to collect an upper fluvial deposits groundwater sample from inside the NSA fence line (shown as 007G00J6 in Figure 1), approximately 30 feet south of the dry cleaners. The sample was collected to evaluate whether the PCE detected in the downgradient wells was from the NSA Southside. No PCE was detected in this groundwater sample.

The source of PCE was further evaluated in February 1997, with a hydropunch sampler driven by a rotary sonic drill rig which allowed collection of groundwater samples from the middle and lower sections of the fluvial deposits, depths formerly not accessible using the earlier DPT methods. Five sample locations were selected (shown in Figure 1 as 007G00J1 through 007G00J5) where groundwater from the middle and lower portions of the fluvial deposits was collected. As shown in Figure 1, PCE was not detected at locations southeast of the dry cleaners (007G00J2) and due east of the BG5 (007G00J1) toward SWMU 5. However, concentrations were detected at locations southeast of BG5, and between BG5 and the retail strip center. The highest PCE concentration (729 μg/L) was in the middle fluvial deposits sample collected from 007G00J4, west-northwest of the retail strip center.

To more accurately define the groundwater flow direction in the area between SWMU 5, BG5, and the strip center, fluvial deposits monitoring well OBGG14MF was constructed in March 1997. Coupling groundwater elevations from the new well and monitoring wells 005G02UF and BG5-UF allowed triangulation and construction of the potentiometric surface illustrated in Figure 1. As shown, groundwater in the fluvial deposits flows west in this area of the base. PCE was not detected in monitoring well 0BGG14MF.

Conclusions

Potentiometric and analytical data indicate that the PCE found in the fluvial deposits groundwater at background well cluster (BG5) is not originating from Navy property. The increase in PCE concentrations immediately downgradient from the strip center, coupled with the absence of concentrations upgradient and behind the strip center, suggest the PCE may be originating from the strip center and not from the NSA Southside. The absence of PCE in SWMU 5 samples, and samples collected between SWMU 5 and well cluster BG5 indicate the contaminant is not originating from the NSA Northside.



LEGEND

▲ VOC NOT DETECTED, OR DETECTED VOC CONCENTRATION DOES NOT EXCEED THE RBC FOR TAP WATER OR THE MCL FOR DRINKING WATER.

▲ DETECTED VOC CONCENTRATION EXCEEDS THE RBC FOR TAP WATER AND/OR THE MCL FOR DRINKING WATER.

007G00J1 ROTASONIC GROUNDWATER SAMPLE DESIGNATION

BG5G007 DPT GROUNDWATER SAMPLE DESIGNATION

OBGG05LS MONITORING WELL LOCATION AND DESIGNATION

23.7 µg/L/28.0 µg/L PCE (50') — 23.7 µg/L PCE WERE DETECTED IN THE PRIMARY GROUNDWATER SAMPLE, AND 28.0 µg/L PCE WERE DETECTED IN THE DUPLICATE GROUNDWATER SAMPLE COLLECTED FROM 50' BELOW LAND SURFACE.

ND NO VOCs WERE DETECTED IN THIS GROUNDWATER SAMPLE.

PCE TETRACHLOROETHENE

TCE TRICHLOROETHENE

µg/L MICROGRAMS PER LITER, OR PARTS PER BILLION

258 POTENTIOMETRIC SURFACE CONTOUR OF FLUVIAL DEPOSITS GROUNDWATER, WITH ARROW INDICATING FLOW DIRECTION

259.81' FLUVIAL DEPOSITS GROUNDWATER ELEVATION, MEASURED 4/23/97

200 0 200 Feet

RCRA FACILITY INVESTIGATION
NAVAL SUPPORT ACTIVITY MEMPHIS
MILLINGTON, TENNESSEE

PCE IN GROUNDWATER AT BACKGROUND WELL CLUSTER BG-5
NSA MEMPHIS - MILLINGTON, TENNESSEE